

4.3 Sorting Functions

In the following problem, a set of equations relating x and y is given. Some of the expressions for y are in factored form, and some are in expanded form.

Which form is easier to use to determine whether a function is linear, exponential, quadratic, or none of these?

Which form is easier to use to determine the x - and y -intercepts, rates of change, and maximum or minimum points of the graph of the function?

Problem 4.3 Sorting Functions

Use the following equations for Questions A–C.

(1) $y = x^2 + 8x + 16$

(10) $y = (4x - 3)(x + 1)$

(2) $y = \frac{1}{3}(3^x)$

(11) $y = 20x - 4x^2$

(3) $y = 10 - 2x$

(12) $y = x^2$

(4) $y = 2x^3 + 5$

(13) $y = 3^{x-1}$

(5) $y = (x^2 + 1)(x^2 + 3)$

(14) $y = 16 - 2(x + 3)$

(6) $y = 0.5^x$

(15) $y = 4x^2 - x - 3$

(7) $y = 22 - 2x$

(16) $y = x + \frac{1}{x}$

(8) $y = \frac{3}{x}$

(17) $y = 4x(5 - x)$

(9) $y = (x + 4)(x + 4)$

(18) $y = 2(x - 3) + 6(1 - x)$

A. Which equations represent functions that are

- 1.** linear? **2.** exponential? **3.** quadratic?

B. 1. For each function in Question A, find those equations that represent the same function.

- 2.** Without graphing the equation, describe the shape of the graph of those equations in part (1). Give as much detail as possible, including patterns of change, intercepts, and maximum and minimum points.

C. Pick one linear, one quadratic, and one exponential equation.

Describe a problem that could be represented by each equation.

ACE Homework starts on page 60.